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**LAND VALUATION:
a key tool for disaster
risk management**

**L'ÉVALUATION
FONCIÈRE:
un outil fondamental
dans la gestion des
risques de catastrophe**

**ESTIMACIÓN DEL
VALOR DE LA TIERRA:
un instrumento clave
para la gestión del
riesgo de desastres**

ABSTRACT

LAND VALUATION

DISASTER
RISK MANAGEMENT

LAND ADMINISTRATION

Much has been written about land issues in responding to natural disasters and on the role of land administration in Disaster Risk Management (DRM). It is important to address land issues at all stages of DRM to help protect the rights of the vulnerable. This paper looks at one of the three elements of land administration – the valuation of land – and considers its role in DRM. The work is considered in the context of the emergency response and post-disaster phases of a DRM Framework and draws on existing literature and case studies developed by the authors and others in developing countries.

The impact of natural disasters on property values is considered, as well as the relationship among land tenure, land value and land

RÉSUMÉ

ÉVALUATION FONCIÈRE

GESTION DES RISQUES
DE CATASTROPHE

ADMINISTRATION FONCIÈRE

On a beaucoup écrit au sujet des questions foncières en réponse aux catastrophes naturelles et sur le rôle de l'administration foncière dans la gestion des risques de catastrophe. Il est important de faire face à ces questions à toutes les étapes de la gestion des risques de catastrophe pour contribuer à protéger les droits des personnes vulnérables. Cet article se consacre à l'un des trois éléments de l'administration foncière – l'évaluation des terres – et se penche sur son rôle dans la gestion des risques de catastrophe. Ce travail est axé sur le contexte des interventions d'urgence et des phases post-catastrophe dans le cadre de gestion des risques de catastrophe et s'appuie sur des publications existantes et des études

SUMARIO

ESTIMACIÓN DEL VALOR
DE LA TIERRA

GESTIÓN DEL RIESGO
DE DESASTRES

ADMINISTRACIÓN DE LA TIERRA

Se ha escrito mucho acerca de las cuestiones relativas a la tierra a la hora de intervenir en situaciones de emergencia ante catástrofes naturales y de la función de la administración de la tierra en la gestión del riesgo de desastres. Es importante abordar las cuestiones relacionadas con la tierra en todas las fases de la gestión del riesgo de desastres a fin de ayudar a proteger los derechos de las personas vulnerables. En este documento se observa uno de los tres elementos de la administración de la tierra –la valoración de la tierra– y se estudia su función en la gestión del riesgo de desastres. Este trabajo debe considerarse en el contexto de las fases de intervención en situaciones de emergencia y posteriores a una

use control, and how land valuation can support emergency response, recovery and reconstruction after natural disasters. We also consider how land valuation and taxation are related in the context of DRM. This includes valuation to support estimates of damage and loss, effective decisions on resettlement and compensation, and for insurance purposes. We conclude that land valuation and taxation are key tools in DRM.

de cas élaborées par les auteurs et d'autres intervenants dans les pays en développement.

Ce travail prend en considération l'impact des catastrophes naturelles sur la valeur des biens, ainsi que la relation entre régime foncier, valeur foncière et contrôle de l'utilisation des terres, et la manière dont l'évaluation des terres peut venir en appui aux phases d'intervention d'urgence, de relèvement et de reconstruction qui font suite à une catastrophe naturelle. Nous prenons également en compte la mesure dans laquelle évaluation foncière et fiscalité sont liées dans le cadre de la gestion des risques de catastrophe. L'évaluation peut notamment servir à estimer les pertes et les dommages, à prendre des décisions efficaces sur les questions de réinstallation et d'indemnisation, et être utile pour les problèmes liés aux assurances. Nous parvenons à la conclusion que l'évaluation foncière et la fiscalité sont des outils fondamentaux de la gestion des risques de catastrophe.

catástrofe del marco de gestión del riesgo de desastres, y está basado en bibliografía existente y estudios de casos elaborados por los mismos autores y otras personas provenientes de países en desarrollo.

Se toman en consideración las repercusiones de las catástrofes naturales en el valor de las propiedades, así como la relación entre la tenencia de la tierra, el valor de la tierra y el control del uso de la tierra, y la forma en que la estimación del valor de la tierra puede respaldar la intervención en una situación de emergencia, la recuperación y la reconstrucción tras una catástrofe natural. También se considera la forma en que están relacionados la estimación del valor de la tierra y el sistema tributario en el contexto de la gestión del riesgo de desastres. Aquí cabe destacar el apoyo que presta la valoración a la hora de estimar daños y pérdidas, tomar decisiones eficaces sobre reasentamiento y compensación, y a efectos del seguro. Al final se concluye que la estimación del valor de la tierra y el sistema tributario son instrumentos fundamentales para la gestión del riesgo de desastres.



INTRODUCTION

Natural disasters have many different causes and include geophysical disasters such as earthquakes and tsunamis, and hydro-meteorological disasters such as cyclones and floods. Many disasters are rapid-onset and little warning is given. The resulting damage takes many different forms, including death and displacement of many people, as well as damage to land, buildings, crops and livestock. Natural disasters occur on widely different scales with different impacts depending on the context. Responses to different disasters are equally varied and the role of valuers reflects this diversity.

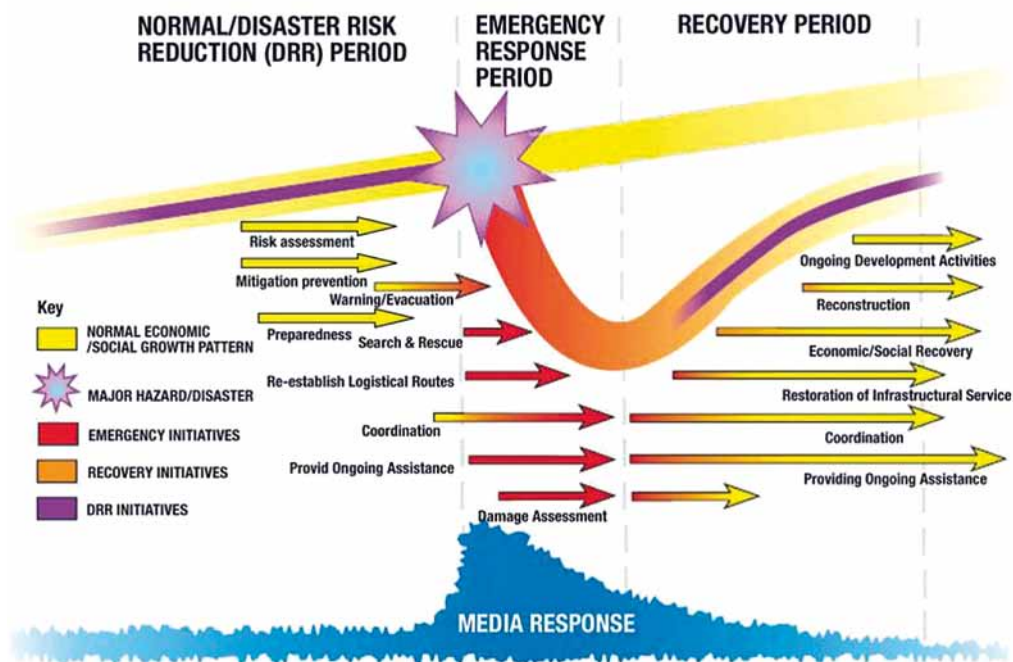
This paper provides an overview of the role of land valuation in emergency response, recovery and reconstruction following natural disasters. It includes a review of the potential role and requirements for land valuation in the context of a DRM Framework (see Figure 1), particularly with regard to the way in which land valuation can help address the land issues that can follow a natural disaster. These land issues have been identified in various papers (e.g. UN-HABITAT/FAO/CWGER/GLTN, 2010; Mitchell, 2010) and include the loss of access to land, shelter and livelihoods due to damage from the disaster, resettlement issues, or an inability of people to prove the legal or social legitimacy of their rights to land. The poor and already vulnerable are often most at risk.

The Hyogo Framework for Action 2005–2015 (UNISDR, 2005) aims at substantial reduction in loss of life and economic losses through the implementation of Disaster Risk Reduction (DRR) strategies in DRM. This includes the incorporation of pre-disaster and post-disaster activities into a DRM approach. DRM is defined by UNISDR (2009) as “the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters”. It is a management approach that combines prevention, mitigation and preparedness with emergency response and recovery.

The DRM Framework breaks the process of DRM into three phases: pre-disaster, emergency response and post-disaster. It brings together development activities of mitigation and prevention as well as relief and recovery, with

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Figure 1
Disaster Risk Management Framework (Baas *et al.*, 2008)



preparedness linking the development and humanitarian activities. This paper will concentrate on the emergency response and post-disaster stages.

The paper builds upon previous work by the authors and is based on a literature review and the discussion draws on several examples from various countries to illustrate the points made. We consider how effective land valuation can support post-disaster emergency response, recovery and reconstruction activities. The separate disaster response functions that benefit from valuation expertise include insurance, compensation, property tax, compulsory purchase and strategic advice to governments. Issues about



compensation, property rights, resettlement, livelihoods, shelter and food security are all key elements in the discussion. Some of the barriers to effective land valuation in a post-disaster context are also discussed. These include the difficulties of effectively and equitably valuing informal tenures such as customary land, or informal settlements and the impact on disaster management. The research contributes to the existing literature on the impact of disasters on the built environment and food security, and in particular the effect on emerging economies.

HOW NATURAL DISASTERS IMPACT LAND VALUE

In this section we explore the relationship between land tenure, value and use in the context of disaster management, and the impact of climate change and natural disasters on land value.

The relationship between land tenure, value and use in the context of disaster management

The provision of shelter and livelihoods, and therefore food security, depends on access to land. In very disaster-prone areas, where land tenure rights are either legally secure (*de jure*) or socially legitimate (*de facto*), people have confidence in undertaking disaster mitigation and preventive actions, and have confidence they can return to their land after a disaster. If, however, their land tenure rights are not secure, they face a real risk of either the government preventing them from rebuilding in the same place, or of being the victims of land-grabbing. Improved tenure security, and therefore access to land, provides an incentive for landholders to invest in measures to improve their land, such as soil protection, tree planting, pasture improvement, irrigation or sustainable cropping (FAO, 2011).

Correa *et al.* (2011) noted that land use and occupation reflect the prevailing development model in a country and argued that disaster risk is a cumulative result of deficiencies in this development planning. Many countries experience increasingly urbanized populations with pressure for land resulting in informal settlements on unsuitable or unsafe land. The result is that some people are

In very disaster-prone areas, where land tenure rights are either legally secure or socially legitimate, people have confidence in undertaking disaster mitigation and preventive actions, and have confidence they can return to their land after a disaster. If their land tenure rights are not secure, they face a real risk of either the government preventing them from rebuilding in the same place, or of being the victims of land-grabbing

more vulnerable because of a higher risk from hazards, insecure tenure (e.g. informal settlements) and also lower land values.

Changes in government policy can affect property value. There are very strong links between changes made under land-use planning or master planning processes and resultant changes in land value. Similarly, releasing information identifying an area as hazard-prone, or as an area to be investigated for potential resettlement, can result in property devaluation. Jha *et al.* (2010) noted this impact in both urban and rural areas. In urban areas land values are higher and land tenure is more complex. Pre-disaster or post-disaster changes to land-use planning have an impact on property value, meaning a transparent approach to planning is essential. In rural areas, the settlements form a relatively small part of the landscape and values are lower. Land tenure issues tend to be less complex and the sense of ownership is higher in rural areas. Unlike in urban areas land-use planning may not dramatically change rural land values.

Changes made to create development-free (buffer) zones after a disaster can also have a dramatic impact on property values and tenure. For example, in Padang city in Indonesia the land use master plans that created zoning (both the 2004–2024 and 2008–2028 plans) established some of the forested areas as buffer zones. This led to the land office not being able to register the land of people who had been living there for a long period (since before the change in zoning), and issue building permits. The result was a reduction in the tenure security of the people living in the forested area and a resultant impact on the value of property (Syahid, 2011).

The links are also evident in western countries. When Hurricane Betsy struck the New Orleans region in 1965, navigation canals and urbanization of low-lying areas contributed substantially to flood damage. After the hurricane, Congress authorized the construction of hurricane-protection levees, flood-walls and gates to protect developed areas as well as adjacent marshes. The flood protection measures increased real estate values and over 75 000 homes were built over the following years, most of them on concrete slabs at grade level rather than the traditional raised brick piers. This increased the flood risk, as illustrated by the impact of Hurricane Katrina forty years later (Stanfield *et al.*, 2008).

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The impact of climate change and natural disasters on land value

Climate change is expected to lead to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events (IPCC, 2012). It will potentially magnify the existing patterns of disaster risk and place extra pressure on the capacities of governments and agencies to respond. FAO notes that food security and agricultural livelihoods in vulnerable countries will be among the issues more severely impacted by climate change. They argue for urgent investments in DRR, above and beyond present levels, to support food and nutrition security (FAO, 2011). UN-HABITAT (2011) states that urban development can bring increased vulnerability to climate hazards. Many cities are facing rapid growth due to urbanization, leading to the creation of informal settlements that are often vulnerable to natural disasters.

While the focus of this paper is on the role of land valuation in supporting DRM activities to enhance disaster response and recovery, there are also direct and indirect benefits to settlements and shelter and these are discussed throughout. Quan and Dyer (2005) argued that the more vulnerable within hazard-prone areas might be forced to settle there (such as near a flood-prone river or at the base of an unstable hillside) because of the lack of any affordable alternatives. This includes people with poor security of tenure, such as informal settlers. People who rely on third-party agreements, such as farm labourers, lessees and sharecroppers, can also be vulnerable to loss of access to land if a disaster occurs. Additional vulnerable groups are the elderly, women, children, and minorities. These groups' rights may not be adequately considered when post-disaster decisions are made.

After a disaster, wherever there are involuntary changes to where a person lives, or the quality of their housing, or their access to livelihoods, land valuation can help estimate those changes for the purposes of compensation. Decisions made to resettle people under a DRM or land-use planning process also impact property values. Those who are resettled require valuations to ascertain that they receive at least as good conditions after the resettlement as they had before. However, others can also be affected. Where people are resettled with a host community there may be an impact on their property value and accurate valuations can help to assess this impact.

After a disaster, wherever there are involuntary changes to where a person lives, or the quality of their housing, or their access to livelihoods, land valuation can help estimate those changes for the purposes of compensation

Damage resulting from the impact of a disaster can also have a significant impact on property values. Syahid (2011) reported that following earthquakes in Indonesia in 2004 and 2007 some people left their properties in the high hazard-risk zone, resulting in a considerable depreciation in property values. In post-tsunami Japan, concerns over living in the lower areas near the coast placed downward pressure on property values. According to the Japanese National Land Use Planning Act, the government can declare an area under land price surveillance when concerned about an unusual rise in land prices (Kaidzu, 2011).

In New Zealand, a series of approximately 8 000 earthquakes and aftershocks starting in 2010 caused widespread damage to land and buildings and had a significant impact on confidence in the property market. The relative property values across Christchurch were permanently altered by factors such as the geotechnical classification of soils regarding their suitability for building foundations, and the compliance of building structures with earthquake codes (and the resulting ability to obtain insurance) being the most important determinants of buyer confidence (Sullivan and Grant, 2012).

LAND ADMINISTRATION AND LAND VALUATION

Land administration comprises three components, the administration of land tenure, land value and land use. There are strong interrelationships between each function. In countries with more formal legal systems of land tenure, rights to land are typically managed based on an accepted land policy and legal framework. In many emerging economies, land authorities maintain cadastral maps and records of land ownership, which may be paper-based. Initiatives to convert such land records to digital records increase the security of the records and also increase the protection for the proprietors in the event of a disaster.

As mentioned earlier, the benefits of valuation expertise to the functions of land-use planning and the recording of land tenure cover the areas of insurance, compensation, property tax, compulsory purchase and strategic advice to governments. However, valuations are carried out for a specific



purpose, with different approaches used depending on the purpose. In countries with a market economy, property has a value and this is critical for all property-related decisions – by individuals to purchase, by banks deciding to consider what is appropriate to lend against a property, by local government with regard to decisions to deal with land and buildings under its control. Effective property valuation underwrites many aspects of a functioning market economy.

There are three long-established codes of international valuation standards: the International Valuation Standards Council (IVSC) applies internationally, while the RICS Valuation – Professional Standards (The Red Book) and the European Group of Valuers' Association (TeGOVA) standards have also been adopted widely. However, valuation standards do not specify methods of valuation.

Property is commonly taxed by government at various levels and the basis for this taxation is determination of the value of the property. This taxation may be in the form of an annual charge (e.g. rates) based on an estimate of the value of the property or may be on the basis of a tax on the transfer of property (e.g. stamp duty). Annual taxation forms a significant income source for government and may contribute greatly towards reform to decentralize land administration (Dale *et al.*, 2007; Munro-Faure, 2012).

Valuation (assessment of property values) is typically needed to support:

- Transfer of ownership.
- Financing and credit.
- Gathering of revenues through property taxation.
- Asset valuation.
- Decisions on compensation related to land acquisition or resettlement of people.
- Cost-benefit analysis of various scenarios related to DRM projects.
- Insurance.

An efficient and transparent land market helps to make the valuation of property more transparent and allows for the implementation of fiscal policy in a way that citizens can understand. Another benefit is that it provides more reliable information on property values. Incorrect valuations can lead to disputes and social tension and processes are required for the adjudication

of valuation and taxation disputes (Dale *et al.*, 2007). Property valuation records are important for establishing appropriate levels of compensation when private land is acquired by government, or when people are resettled under a DRM programme.

The aftermath of a disaster poses particular challenges for property valuation. During these periods real property markets in affected areas often exhibit instability, even chaos. Analysing market data after a disaster can be difficult. For example, in many cases destruction causes shortages of properties that people and businesses are willing to occupy and a consequent increase in prices for those that are suitable (see e.g. Sullivan and Grant, 2012). As real property is not a liquid asset, markets for some types of property are small with limited opportunities for transfer. In many emerging economies, only a very small percentage of agricultural land is sold on the open market. This scarcity of evidence may be compounded by attempts at tax evasion that lead to a sale price stated in records that does not reflect the true sale price.

In developing countries and emerging markets the challenges include:

- Inadequate legal frameworks that do not allow for the efficient functioning of the property market.
- Lack of published information or difficulty in obtaining information regarding transactional as well as other data requisite for proper valuation.
- Greater volatility of property markets.
- Lack of adequately trained professional valuers.
- Out-dated (or absence of) national standards.
- External pressure.
- Excessive or insufficient government interference.

LAND VALUATION AND TAXATION IN EMERGENCY RESPONSE, RECOVERY AND RECONSTRUCTION PHASES

This section outlines some of the ways that effective land valuation and property taxation measures can support post-disaster emergency response, recovery and reconstruction activities. The effect of poor land valuation on land governance in a post-disaster context is also considered.



However, in many emerging economies land agencies have inadequate valuation capacity to adequately respond to many natural disasters. For example, in Fiji the Department of Lands and Survey undertakes valuations of all properties within cities and villages under the Local Government Act 1972, as a basis for calculating property rates according to Unimproved Capital Value. Although the majority of properties valued are leasehold, the rates are fixed based on freehold tenure. A 2001 report found that in practice rural areas are not valued for property rates, which has led to many freehold properties being held by land speculators, reducing supply and increasing market values. Valuation records are patchy and undermine the calculation of compensation and rental payments associated with land acquisition for public purposes (Hassan, 2001).

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Post-disaster rapid assessments

Rapid assessments are made in relation to damage and loss, needs, and gender during the recovery phase and property valuation information (if available) can be very important in estimating the economic losses. These assessments are undertaken to determine the scope, scale and distribution of the impact of the natural disaster and identify issues that may affect the response. They provide information on the needs, possible intervention types and the resource requirements. They can include damage and loss, shelter, livelihoods, agriculture, infrastructure and vulnerability assessments. Land agencies' valuation departments should be involved to provide valuation information and estimates.

For example, a rapid assessment was undertaken in 2010 for the Government of St. Lucia, shortly after the impact of Hurricane Tomas. The aim was to determine the social, environmental and economic impacts, plus the short- and long-term needs and priorities. In this case there was a strong link to land tenure. While the land tenure in agricultural areas was considered in this assessment, no mention was made of the tenure of the affected agricultural holdings, even though this would have impacted on the farmers' ability to have acquired insurance and recover from loss (Griffiths-Charles, 2012).

Estimating damage and loss

Although the emergency response phase is mostly about saving lives and getting basic temporary restoration of transport, communications networks, and preliminary repairs to critical public utilities, there is also need to make preliminary estimates of the loss of public and private property. In completing the damage, loss and needs assessment phases of disaster recovery, valuations are essential to estimate the economic losses. To calculate losses, valuers need to estimate the economic value prior to the disaster (retrospective value) and post-disaster. These valuations can be used for insurance or compensation purposes, for mortgage lending (homeowners need to refinance/borrow to rebuild), rental assessment, and as cost-benefit analysis on where to allocate limited resources in the disaster recovery. The World Bank publication *Safer Homes, Stronger Communities* (Jha *et al.*, 2010) stated:

"Accurate, comparable, and appropriately scaled information provides the basis for damage and loss assessments (DaLAs), and related decision making concerning recovery and reconstruction. Assessments are time- and labour-intensive, must be conducted rapidly, and must meet quality standards. For these reasons, numerous initiatives have been launched to expand the use of technology to improve the timeliness, quantity, and quality of assessment results".

In 2010 digital geospatial information and spatial analysis techniques were not used. However, the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank were developing standards and training manuals for mission teams to integrate spatial analysis into assessments. The authors believe that it is important for post-disaster rapid assessments to include questions on the quality of land valuation records, the legislation with regard to land acquisition and compensation, and for information on land value to be available with other spatial data.

In addition to economic loss, cultural goods and landmarks may be lost. Traditional valuation approaches are not appropriate for such special properties and goods, and thus non-economic valuation methods should be applied such as derived benefits methods, cost-based methods, revealed preference methods, and stated preference methods.

In completing the damage, loss and needs assessment phases of disaster recovery, valuations are essential to estimate the economic losses



Valuation to support a cost–benefit analysis for recovery planning

Valuations support post-disaster planning for recovery. Valuation of public assets, such as government buildings, schools, and public infrastructures such as roads and utilities can aid recovery decision-making. In the case of an earthquake for example, information on the cost of repairing or rebuilding damaged public buildings might be urgently required. Valuers will also have a role when land or buildings are acquired for public purposes associated with the recovery, or requisitioned for temporary use by the public sector.

Valuations are essential in needs assessments to determine the financial resources needed to implement recovery, reconstruction and risk management. When planning recovery, valuations can be used to determine best use of available resources and where such funds are best allocated.

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Moving from transitional shelter to resettlement

The Pinheiro principles outline that all displaced persons have the right to have restored to them any land and housing of which they were arbitrarily deprived. Resettlement for the long-term should not be the first option as there are many difficulties to overcome. Correa *et al.* (2011) stated:

"Relocating a population, its economic activities, and its social networks and relations, as well as its natural physical and built environment (buildings, infrastructure, and facilities) is a complex process with significant impacts—direct and indirect—on the population and on governments. A resettlement process may become an opportunity for comprehensive improvement in the quality of life of the population, even exceeding the direct objectives of disaster risk reduction. But if not duly planned or conceived as a complementary action integrated into a comprehensive risk management strategy, it may lead to ineffective and unsustainable processes that create frustration for families and governments alike.... A poorly planned and executed resettlement program can lead to social, economic, and cultural disasters even more serious than the natural disaster risks it is intended to prevent".

Decisions on whether to resettle hazard-prone people are best made before a disaster as a preventive response (Correa *et al.*, 2011), where the decisions and

options can be based on in-depth technical analysis and extensive community consultation. However, often this has not occurred and a disaster can highlight the vulnerability of individuals and communities.

For example, the land governance assessment framework (LGAF) in the Philippines (Eleazar *et al.*, 2013) provides one example of the challenges that can arise where a clear policy on resettlement and compensation is absent. The report notes that existing expropriation policies are inconsistent, and the preparation of Resettlement Action Plans (RAPs) not supported by a national policy. Aside from foreign assisted projects (which have RAPs) agencies have no legal basis to prepare RAPs and the payment of adequate compensation. Other projects use compensation based on assessed values, paying only 15 percent of the total value to acquire the property. The report suggested that the government should formulate a national resettlement policy that provides for prompt and reasonable compensation, grievance redress and a programme for sustainable livelihood restoration.

Studies of the pre-disaster conditions (including property value) make it possible to identify the requirements of people who need to be resettled. These requirements allow a search for suitable locations and existing housing supply. Resettlement options can include:

- Collective resettlement, where land is provided for more than one family, as well as activities to re-establish the lost livelihoods.
- Individual resettlement of an individual family to an available dwelling and adequate compensation is sufficient to find decent and safe housing, but does not consist solely of financial compensation (Correa *et al.*, 2011).

The choice of tenure used for resettlement has implications for the process and for valuation. Available land may exist across the continuum of tenure types. Jha *et al.* (2011) included the following measures to consider when responding to the landless and refugees who need to be relocated:

- Acquire suitable public land. Using public land for relocation is a common solution because it does not involve acquisition from proprietors and the related compensation. However, this process should be preceded by a good site evaluation and availability is not sufficient justification.

The choice of tenure used for resettlement has implications for the process and for valuation. Available land may exist across the continuum of tenure types



For example, in many contexts in Africa a public ground inspection and consultations with local communities are necessary to establish that the land is vacant.

- Market-based acquisition of private land. The process involves a market-based acquisition from people with legitimate tenure rights willing to sell and should be based on the best available land valuation information.
- Eminent domain (land acquisition) of private land. This includes both formal and informal tenures across the continuum.
- Government offers limited fiscal incentives to sellers (property tax rebate).

Compensation for individual resettlement

In cases where the original parcel or holding cannot be returned, the *Voluntary Guidelines on the Responsible Governance of Tenure* (FAO/CFS, 2012) call for states to provide prompt and just compensation and to ensure the equitable treatment of all affected people. The Voluntary Guidelines also specify that this compensation should be in the form of money, and/or alternative parcels or holdings. Individual resettlement should include compensation for the property in the at-risk area, plus additional compensation for loss of income, and to cover the costs of moving. When people with legitimate tenure rights do not have land records or their housing is low-cost, a subsidy to purchase a property on the market may be provided. In some cases a combination of these two options is offered. Information is required on the value of the land and structures, indicating the amount invested in the property and therefore the amount of compensation they may receive. It is important for the head of household (or productive unit) to be present at the time of the valuation. Care is needed, however, because for people with legitimate rights living in vulnerable areas, compensation based on a traditional valuation of their land will not be enough for them to afford housing in a different place. They may move to another disaster-prone area where they can afford the land (Correa, 2011).

An example is in Bhachau, India following the 2001 earthquake. Virtually all houses were destroyed and about ten percent of landowners could not produce land records documenting their rights. In 2003 pre-disaster satellite imagery was used to identify and mark plot boundaries with an average plot size of 50–80 m². A systematic regularization process was developed,

with the reconstruction done mostly *in situ*. A land valuation committee assessed values at substantially less than market prices. The amount to be paid by the informal settlers for the land was about Rs 8 000 for a 25 m² plot, substantially less than the market price of Rs 30 000–40 000. Based on a housing reconstruction policy that provided for 25 m², the government recommended people accept this smaller area as the *de jure* right, and accept that the remaining 25–50 m² be maintained as a *de facto* occupation. The policy therefore contributed to undermining security of tenure (UN-HABITAT/FAO/CWGER/GLTN, 2010).

Correa (2011) noted the principle of shared responsibility of the state in which the state has the responsibility to protect people. Under this principle, it is assumed that the human settlement was sited in a high-risk area based on government decisions to grant permits, or that there was a lack of land-use planning to prevent the establishment of these settlements in high-risk areas. They stress that property valuations must not depreciate the property because of the disaster risk, to ensure the compensation is sufficient to purchase suitable lawful and safe housing on the market.

Property valuations must not depreciate the property because of the disaster risk, to ensure the compensation is sufficient to purchase suitable lawful and safe housing on the market

Compensation for land acquisition

Often public land is chosen for the site where people are to be resettled, or where infrastructure is to be built. Compensation is often required where public land is occupied by people with legitimate informal or customary rights. Where private or communal land is used for resettlement or construction a land acquisition process may be required. However, there is potential for conflict where the land acquisition arbitrarily displaces people and the process does not involve adequate consultation or compensation. Land acquisition and compensation disputes may also delay recovery and reconstruction. The Voluntary Guidelines state that, "States should ensure a fair valuation and prompt compensation in accordance with national law. Among other forms, the compensation may be, for example, in cash, rights to alternative areas, or a combination" (FAO/CFS, 2012). Responsible land governance therefore requires states to have guidelines and regulations for establishing fair compensation and mechanisms to ensure it is paid in a timely manner. In some circumstances compensation will need to be paid in advance to allow people to resettle.



The following examples from India and New Zealand illustrate some differences among countries. In Gujarat, India, legislation detailed a process for land consolidation to provide land for infrastructure and other public purposes. The Town Planning and Urban Development Act specifies that the authority can claim up to 40 percent of the land for roads, parks, open space, social infrastructure and for sale by the appropriate authority. The proceeds from the sale are used to provide infrastructure. The act provides mechanisms to value the land being acquired, with some receiving compensation, but others owing money to the authority. Residents were given the option of taking up plots in the re-location sites in return for transferring all rights on their old site to the government. The Act also provides for grievance mechanisms, and the government appointed an ombudsman to keep issues out of court and provide speedy solutions (UN-HABITAT/FAO/CWGER/GLTN, 2010).

During the earthquake recovery and reconstruction phases the New Zealand government designated Red Zones (Sullivan and Grant, 2012) (see Figure 2) of land parcels that were unfit for continued residential use due to ongoing risks of earthquake-induced soil liquefaction and the consequent inability to provide secure building foundations or services (water, sewerage, power, etc.) to properties in those areas. Due to the magnitude of the acquisition and the need to provide certainty to landowners as soon as possible, the government announced an offer to acquire residential properties that were no longer able to be occupied (Canterbury Earthquake Recovery Authority, 2013). That offer was based on the most recent mass appraisal rating valuations for Christchurch, which at the time of the first offer in 2011 were the values dated August 1st, 2007. These mass appraisal valuations were assessed using a market value definition for both capital value and land value across a council area and were primarily intended for council rating purposes rather than for compensation (Sullivan and Grant, 2012).

In determining appropriate compensation, the guiding principles of equity and equivalence should be applied. Equivalence in this context means that people should receive no more or no less than their loss. Government should balance interests to safeguard the rights of those who lose ownership or rights while ensuring public interest is not jeopardized, and be flexible with lucid guidelines, but also allow flexibility in a given situation to provide equivalent compensation (FAO, 2009).

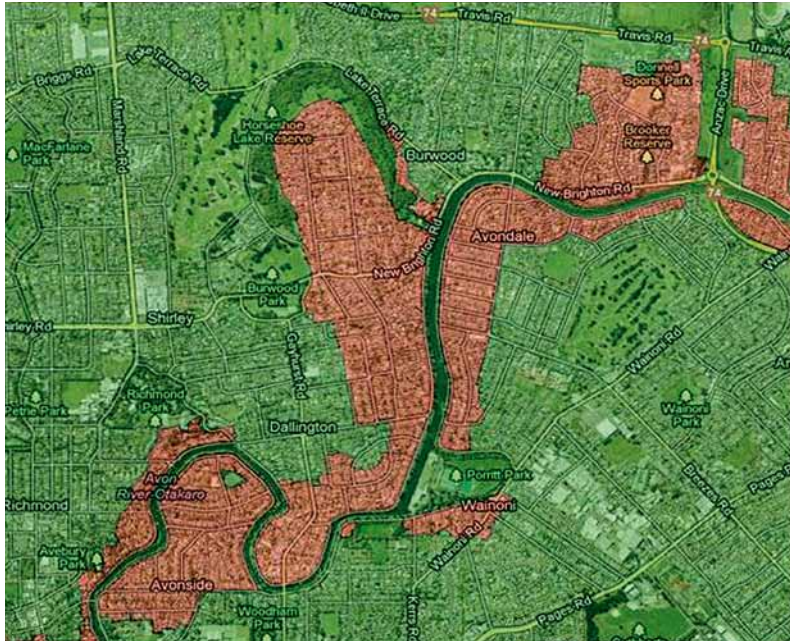


Figure 2
**Government-designated Red Zones
 in Christchurch, New Zealand
 where compulsory
 acquisition applied**
 (source: Sullivan and Grant, 2012)

VALUATION IN THE RECONSTRUCTION PHASE

A major natural disaster will have immediate impact on market values and often for many years following. In some communities there may be looting and other civil turmoil that can also negatively impact values. In other markets, people affected by a disaster may relocate to an area that was not impacted. This creates more demand, resulting in an increase in values in the non-affected areas. This may create a situation where insurance, or government compensation, is not sufficient to assist affected property owners relocate in same community. This is especially true for rental housing because displaced homeowners seek short-term rentals and for the influx of outside aid workers and trades persons working on the recovery. Valuers will be needed in the early economic reconstruction phase to support assessment



of insurance payments, in any processes to regularize the land ownership structure, in the decision to offer taxation incentives, and in the protection of land markets. Valuation will be required for private land and buildings, as well as public land and infrastructure.

Valuation for insurance purposes

Insurance can be a very important tool for disaster mitigation and in some contexts is the only available remedy. The valuer and loss-adjuster support the insurance function by quantifying the risk insured before the event and supporting claims after the event. When large-scale disasters occur it is usually difficult to mobilize valuation and loss-adjusting expertise fast enough to settle claims promptly enough to prevent hardship. This is frequently a critical factor.

Insurance is usually, although not always, a private sector function and insurance companies are usually private sector entities. The policy-holders are usually individuals or private companies. It is rare, although not unknown, for the public sector to provide insurance cover or arrange reinsurance for those large-scale risks that private sector insurers refuse to cover at the property level. This can especially be the case for natural disasters where huge financial risks may be realized across a wide area from a single event.

Central governments almost always carry their own risk. In most cases when disasters occur, public sector property is not covered by insurance. The value of the land itself is not generally insurable. Certain risks related to land are commonly insured, such as subsidence and flooding. The risk insured is usually the cost of consequent damage to buildings or structures as a result of subsidence or flooding and it is not the depreciation in the value of the land. The risk covered for real estate is almost always the cost of rebuilding. The insurance industry deals with risks to chattels, growing crops and buildings in a different manner. For example, crop insurance is rarely available in emerging economies.

The loss is generally not calculated in relation to the open market value of the property. The valuer has a role in calculating building costs, a role which valuers share with quantity surveyors, building surveyors engineers and architects. For example, following Hurricane Katrina, many of the recovery efforts that relied on the market were undermined by market failures that

Valuers will be needed in the early economic reconstruction phase to support assessment of insurance payments, in any processes to regularize the land ownership structure, in the decision to offer taxation incentives, and in the protection of land markets. Valuation will be required for private land and buildings, as well as public land and infrastructure

occurred in the post-hurricane conditions. Another market failure was the response of the homeowners' insurance providers, who raised insurance rates dramatically following the disaster (as much as five-fold). Premiums on a standard US\$ 150 000 home increased from US\$ 600/month to US\$ 3 000/month (Stanfield *et al.*, 2008).

Private individuals can also be uninsured or underinsured when a disaster strikes. Insurance policies cover the losses resulting from the particular insured risks specified in the policy. It often becomes evident when a disaster strikes that some people could have insured against particular risks but either chose not to do so or could not afford to do so. Other cases of underinsurance will exist where the policyholder decides to cover an amount less than the whole loss, and the quantum of the risk insured is not sufficient to cover the loss suffered. The valuer has a role in advising governments about matters of commercial principle and by calculating the cost to the government of making good uninsured losses.

Some risks are not commercially insurable. For instance damage due to war and terrorist action is often not insurable. Damage from known hazards (such as floods in known flood-prone areas) is commonly excluded from the policies for those properties within those areas.

On rare occasions governments may step in:

- After the event to provide reimbursement for risks uninsurable in the market.
- Before the event where the government underwrites the risks of the commercial insurance companies that would otherwise be uninsurable in the market.
- Before the event with a government guaranteed and owned insurance fund such as the Earthquake Commission in New Zealand, which is supported by a levy on insurance premiums, accumulated investments and reinsurance.

Valuation may be needed to support insurance claims (reinstatement value) where the property is insured, or liability claims against government for failure to prevent the disaster or for a lack of warning. In assessing a claim, the insurance company will need a valuation to determine the economic loss and therefore their responsibility under the terms of the insurance contract.

Valuation may be needed to support insurance claims where the property is insured, or liability claims against government for failure to prevent the disaster or for a lack of warning



Some contracts offer full replacement, in which case the insurer will be responsible to fund full replacement of property.

Other insurance policies only pay for the loss of the improvements. If the property is no longer new it will suffer some type of depreciation, such as functional obsolescence, physical deterioration, and sometimes external obsolescence. Under these situations, the insurance payout may not be sufficient for property owners to rebuild their home or business. In the case of an individual property loss (such as following fire) not related to a natural disaster, the property owner can use the insurance proceeds to buy a replacement property. However, in a community-wide disaster often there will not be other properties to purchase. Thus, these underinsured property owners may need additional financial support to rebuild.

Sources of additional financial support can be in the form of traditional bank loans, micro-financing programmes, low interest government loans, government grants, or special government compensation schemes, or any combination of the above.

For example, valuation was essential in supporting insurance claims in Christchurch, New Zealand following the 2010 and 2011 earthquakes. In excess of 120 000 insurance claims were made to the Earthquake Commission for significant damage. The Earthquake Commission is a government-owned crown entity that provides government-guaranteed insurance for up to NZ\$ 100 000 for residential properties. It is funded by a levy on private residential dwelling insurance and covers that part of the risk that private insurance companies are not prepared to cover (Earthquake Commission, 2012).

However, Bevere and Grollimund (2012) showed the highly variable contribution of insurance in different countries. The 4/9/2010 and 22/2/2011 earthquakes in Canterbury, New Zealand are estimated to have caused economic losses of US\$ 21 billion, including an insurance loss of US\$ 17 billion. This insurance contribution of over 80 percent reflects the impact of the government-guaranteed insurance scheme managed by the Earthquake Commission.

The much larger estimated economic loss of up to US\$ 300 billion following the Tohoku earthquake and tsunami in eastern Japan on 11/3/2011 resulted in an insurance loss of approximately US\$ 35 billion (a 17 percent insurance

contribution). While at the other end of the scale, the Haiti earthquake of 12/1/2010 is estimated to have resulted in an economic loss of US\$ 8 billion (comparable to the first Canterbury earthquake later the same year), but an insurance loss of only US\$ 0.1 billion. This is an insurance contribution of about one percent.

These figures demonstrate that the New Zealand model of government-guaranteed disaster insurance worked well for Canterbury and Christchurch. However, the model of guaranteed disaster insurance supported by well-developed valuation and loss-adjusting professions is not generally available in emerging economies. Therefore, the detailed mechanisms of how that model was applied in New Zealand are not explored further here.

In some communities, particularly small rural communities, after disasters many residents relocate to other communities to find jobs and many never return. Thus such rural towns and town centres are not rebuilt. This can also happen to large cities, such as New Orleans following Hurricane Katrina. Many older pre-disaster neighbourhoods become virtual ghost towns with vacant house lots.

Material loss affects different groups in different ways. Compensation may be provided in the form of cash, livestock or building materials. An assessment of the damage and loss suffered is needed in preparing a compensation package. Valuers can provide information to support decisions on financial compensation and provide advice on the breakdown of costs and in-kind support such as materials, labour and tools (Lloyd-Jones, 2009).

We also note that the above comments on insurance may not apply to informal tenures, such as customary land or informal settlements, that are adversely affected by disasters and where there are more difficulties in establishing the value of the property (both pre-disaster and post-disaster). This presents challenges for assessing fair compensation and may lead to disputes over the compensation offered. These challenges are discussed further in Section 6.2.

Tax concessions and protection of land markets for affected areas

The impact of a disaster on land values noted earlier also has an impact on the taxation revenue generated by government and the ability of individuals



to rebuild. For this reason governments may consider public intervention to protect the land markets in the short- to medium-term.

Stanfield *et al.* (2008) noted that market distortions are inevitable after a major disaster. This is because property values fluctuate substantially, especially in the affected areas, and the increased demand for labour means that wages can rise dramatically during the recovery and reconstruction period. Also, there is an increase in the replacement cost of materials and credit standards tighten. The resources needed for rebuilding cannot be left to market forces and the primary focus must be on supplying resources for infrastructure investments, and then on homeowner rebuilding (or rental) assistance. Stanfield *et al.* (2008) argued that, "A doctrinaire commitment to the market driven approach almost guarantees the greatest number of losers and may well be the slowest method to recovery".

Soon after the 2004 tsunami struck Aceh, the Land Agency (BPN) issued a decree prohibiting the transfer of land as an attempt to protect the tsunami victims from being pressured into hasty transfers (BRR and International Partners, 2005). In another example, following the Japanese earthquake, the land authority provincial government issued a press release stating they would jointly watch land prices. They were concerned that people's preference for highlands would lead to an abnormal rise in land prices (Kaidzu, 2011).

Tax concessions can remove a disincentive to rebuild after a disaster and may also have a positive distorting effect on property markets. Temporary exemptions have also been granted from land and property taxation in some cases following natural disasters. These effects can include waiving property registration taxes. Following the tsunami in Aceh, this included the annual property assessments within the tsunami-affected areas by RALAS and the adjustment in value for property taxation and rates.

Following the 2004 earthquake that struck Padang in Indonesia, the mayor of Padang City issued a regulation waiving the normal requirement for a retribution tax to be paid for the construction of a new building. According to this regulation, those who wanted to get approval for re-constructing houses affected by the earthquake would not be charged until 2010 (Syahid, 2011).

CHALLENGES FOR EFFECTIVE POST-DISASTER VALUATION

Limitations in capacity

There are numerous barriers for valuers in carrying out essential valuation tasks following a disaster, including:

- Potential loss of experienced staff.
- Potential loss of facilities.
- Loss of data resources.
- Property market volatility and risk.

Depending on the scale of the disaster, there is potential loss of experienced valuation and land administration personnel. Some losses could be through either incapacitating injury or death, or more often the relocation of qualified local staff and experts to other communities to seek shelter and livelihoods for their families. There is also a potential for loss of facilities, either entire offices, or public infrastructure (e.g. electrical and water systems, roadways to get to offices) to access and run the valuation office. Entire offices could be destroyed, along with all professional equipment and especially essential information critical to complete a valuation. Even if a valuer can physically get to the office, a typical valuation office still needs electrical power to power their lights and run their computers and printers. Without power, valuers often will not have access to the equipment and information sources needed to complete competent and fast valuations needed for recovery assessment.

In addition to a valuer's loss of private resources (e.g. office buildings and equipment), valuers rely on public resources, such as tax and property records, including ownership, land boundaries, and market sales transactions. Thus the loss of public resources or loss of access to public resources will create substantial barriers for valuers to carry out their work efficiently.

A major disaster will have immediate impact on market values that may also last for many years. In some communities there may be looting and other civil turmoil that can negatively impact values. In other markets, those affected by the disaster may relocate to other areas in the community that were



not impacted. This will create more demand and thus increases in property values in non-affected areas. This may create a situation where insurance or government compensation is not sufficient to assist affected property owners to relocate in the same community. This is especially true for rental housing, as displaced homeowners seek short-term rentals and for influx of outside aid workers and trades persons working on the recovery.

Other ongoing limitations or barriers for valuers include the lack of current market information following a disaster that reflects the current market values. Property records may be lost and thus there may be no information on specific transactions (sales, leases, etc.) or the properties themselves. In some developing countries, property records are still recorded on paper documents and thus can be easily destroyed in a disaster. Without these documents, valuers, land surveyors and other land administration functions are severely hampered. Loss of documents, or lack of access to reliable public records, may also lead to increased conflict over property ownership. Unscrupulous land dealings may occur where putative owners claim larger areas or even property that was not theirs.

In many developing countries the land administration system is inefficient and this creates barriers to quality market valuations even prior to a disaster. These include the lack of:

- Detailed public records on properties (ownership, legal boundaries, description of improvements, zoning / planning restrictions)
- Lack of or ease of access to public records for specific properties
- Lack of any valuation practice standards
- Lack of adequately trained and qualified valuers

Also valuers may be exposed to external pressure from property owners who believe their properties to be worth more, from lenders that need a certain value to provide loans, or government agencies that may be seeking low values to save money or high values for political favours. This may occur when the valuer attempts to adopt formal approaches to valuation in an informal setting.

Difficulties in valuing communal and informal tenures

Communal and customary tenure

The Voluntary Guidelines (FAO/CFS, 2012) state in relation to indigenous peoples and other communities with customary tenure systems:

"9.1 State and non-state actors should acknowledge that land, fisheries and forests have social, cultural, spiritual, economic, environmental and political value to indigenous peoples and other communities with customary tenure systems".

The valuation of customary or communal land is a very specialised area not often encountered by most western valuers or those working in formal contexts. Aluko *et al.* (2008) noted that even where sale of land is not contemplated, many situations require an appraisal. These may be needed to support the allocation of a purchase price to a depreciation base in a merger, the establishment of value for *ad valorem* tax assessment, land acquisition and compensation. However, on customary or communal land the assessment of compensation valuation for compulsorily land acquisition is complex.

Some authors, such as Aluko *et al.* (2008), have argued that since indigenous people have a spiritual or sentimental attachment to the land, spiritual values cannot be ignored when valuing native lands or sacred sites for there to be just (equitable) compensation (e.g. Bannerman, 1993; Whipple, 1997; Boydell and Small, 2001; Myers, 2002). In many countries with a large percentage of customary or communal lands (such as many of the South Pacific island countries, and in some countries in Africa) customary lands have often not been formally registered and ownership is held under customary practice. Sometimes this leads to conflict of ownership and use between introduced law and customary law, and often the ownership is unclear. Customary and communal lands may be associated with conflicting claims of ownership and often are inalienable (cannot be sold). There may be no formalized market, and therefore there are little or no market data that valuers can use to estimate value.

Another issue facing valuers is that customary owners often lack knowledge and information about property rights and economic value. This can lead to market volatility and land conflict among neighbouring landowners, within

The valuation of customary or communal land is a very specialised area not often encountered by most western valuers or those working in formal contexts



families, and most often with government. In many developing countries there is a risk that customary owners and traditional freehold property owners will suspect government of assigning low values for compulsory acquisition compensation or that government officials and their acquaintances are paying a below-market price for their own financial or personal stake in the value outcome. To minimize land conflicts clear landownership records need to be established and customary landowners need access to immediate, affordable, competent and unbiased property advice.

The aim of the compensation is to restore the person whose land is acquired to the position that they were in before the acquisition, the state that previously existed. In other words, they should not be worse off as a result of the acquisition of their land. National standards, laws and policies should be established, based on consultation with all stakeholders, which provide guidance on the fair and timely valuation of tenure rights.

Informal settlements

Informal settlements are often located on marginal lands, such as low-lying coastal areas or steep hillsides and are therefore disproportionately affected by natural disasters. The lack of formal recognition of ownership and registration creates issues for compensation because these properties cannot be bought and sold in a formal market. Thus valuers are challenged to establish the market value using non-formal valuation practices and methods.

Also in markets with significant informal settlements, it may be difficult to find suitable and available lands nearby in which to resettle. However, during the post-disaster recovery period there is potential to formalize replacement settlements and enhance the livelihoods of residents. Along with formal registration, there is potential to assess land taxes that can be used for public services.

The 2011 UN-HABITAT and Global Land Tenure Network (GLTN) publication, *Innovative Land and Property Taxation*, provides a commentary on informal land occupation and land markets. The authors argue that informal settlers ignore the need to comply with urban regulations and building codes (which can exacerbate their disaster risk). When sold, the buyers purchase the illegal or extra-legal plots in good faith, even though the properties do not meet urban regulations or provide formal tenure security. In some

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countries public authorities are tolerant of informal settlements. The settlers have few, if any, other housing options and are often poor. They argue that the informality of tenure distorts urban land market functioning because clandestine operators reap higher profits by avoiding taxes, protection of the land, or the provision of needed infrastructure and public services. Land prices in informal settlements are often higher than in surrounding areas when allowance is made for the costs of infrastructure and public services. In informal settlements, a premium may be paid for the expectation of future regularization or upgrading. A lack of property title means buyers have no access to formal credit and sellers often allow instalment payments. The buyer gains access to land without the costs associated with building regulations and the seller is compensated for bringing land on to the market.

For example, UN-HABITAT (2005) reported that land value in Kisumu depends on many factors. Demand for residential properties has caused rapid change in Kisumu and valuation data may not reflect the market values of land parcels. However, generalizing the land value distribution based on the valuation roll provides an overview. An expanding inner city and peri-urban area resulted in higher land values in the slum belt, making it more expensive for the local authority to purchase land for the development of access networks (UN-HABITAT, 2005).

Resolving disputes over land value

Poor estimates of the value of a property often lead to disputes. These include disputes over the amount of compensation paid for the resettlement of communities or individuals away from their pre-disaster land, and disputes relating to claims for compensation for the direct or indirect impact of a disaster on land or livelihoods. For example, a community that hosts a resettled community may experience a decline in the value of its property.

Government land acquisition was a major cause of land disputes in Aceh following the 2004 tsunami. A number of roads were blockaded at various times by disgruntled residents who had not received compensation. Other disputes arose as land values in areas slated for infrastructure or resettlement activity substantially increased following the disaster. Landholder expectations for compensation were significantly greater than the official valuations for their land (Fitzpatrick and Zevenbergen, 2008).



CONCLUDING COMMENTS

The value of land is an important element of the information required during much of the process of emergency response, recovery and reconstruction. It supports cost–benefit decisions during recovery planning, and helps to protect the rights of people resettled following a disaster. Making decisions on land tenure, land valuation and land-use planning controls are some of the major roles of land administration, which are important post-disaster. Information on the value of land and buildings is critical for all property-related decisions. Valuation underpins property taxation, which generates an important source of income for government. Equally, decisions to offer tax concessions during the response and recovery phase can remove disincentives to rebuild.

This paper has discussed some of the significant barriers to valuation that exist post-disaster and these should be considered in DRR programmes. Responsible governance of land also requires effective and transparent valuation systems and guidance is now provided in the Voluntary Guidelines and the World Bank Land Governance Assessment Framework.

The value of land is an important element of the information required during much of the process of emergency response, recovery and reconstruction

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